

### Claims

What is claimed is:

1. An apparatus for testing a leakage rate within a recuperator core, said recuperator core having a plurality of components, such components being a plurality of cells being welded one to another, said apparatus comprising:
  - a platform defining a first end and a second end, a first surface of the platform extends between said first end and said second end, a first support portion being attached to said first surface and a second support portion being spaced from said first support portion and each being attached to said first surface;
  - a pair of sealing mechanisms, at least one of said pair of sealing mechanisms being movable between an open or non testing position and a closed or testing position, in said closed or testing position a reservoir being formed ;
  - a pump being operatively connected to at least one of said pair of sealing mechanisms;
  - a monitoring system being operatively connected to said platform, said pair of sealing mechanisms, said reservoir and said pump; and
  - a readout station being operatively connected to said monitoring system, said reservoir and said pump.
2. The apparatus for testing a leak within a recuperator core of claim 1, wherein said monitoring system includes a plurality of sensors.
3. The apparatus for testing a leak within a recuperator core of claim 2, wherein said plurality of sensors operational sensing said pair of sealing mechanisms being in said closed or testing position.

4. The apparatus for testing a leak within a recuperator core of claim 1, wherein said monitoring system has a plurality of safety devices operatively attached thereto.

5. The apparatus for testing a leak within a recuperator core of claim 1, wherein said readout station has a visual indicator.

6. The apparatus for testing a recuperator core of claim 5 wherein readout station visually marks a result of said tested recuperator core on said recuperator core.

7. The apparatus for testing a recuperator core of claim 6 wherein said readout station indicates a decay rate of said recuperator core.

8. The apparatus for testing a recuperator core of claim 2 wherein said plurality of sensors define that said pair of sealing mechanisms are at said open or non-testing position.

9. The apparatus for testing a recuperator core of claim 1 wherein said pump is a vacuum pump.

10. The apparatus for testing a recuperator core of claim 9 wherein a rate of decay has a predefined acceptable rate and a predefined rejection rate for said recuperator core.

11. A method of testing a recuperator core, said recuperator core having a plurality of donor passages defining a donor inlet end and a donor outlet end and a plurality of recipient passages defining a recipient inlet end and a recipient outlet end, said plurality of donor passages being sealed from said

plurality of recipient passages, said method of testing said recuperator core comprising the steps of:

positioning said recuperator core in a test stand;

positioning a sealing member in sealing relationship with one of said donor inlet end and said recipient inlet end and positioning an other of said sealing member in sealing relationship with one of said donor outlet end and said recipient outlet end forming a reservoir and defining a closed or testing position;

actuating a controller applying one of a pressure and a vacuum to said reservoir;

monitoring a rate of decay of said pressure and said vacuum; and displaying said rate of decay.

12. The method of testing the recuperator core of claim 11 wherein said step of monitoring a rate of decay defines an operational core and a failed core.

13. The method of testing the recuperator core of claim 11 wherein after said step of displaying said rate of decay, said sealing member in sealing relationship with one of said donor inlet end and said recipient inlet end and an other of said sealing member in sealing relationship with one of said donor outlet end and said recipient outlet end are disengaged from said closed or testing position into an open or non testing position and said tested core being positioned in one of an operational core position and a failed core position.

14. The method of testing the recuperator core of claim 11 wherein prior to said step of positioning said recuperator core in said test stand

said recuperator core having a guard member position about an “OD” of said recuperator core.

15. The method of testing the recuperator core of claim 11 including positioning a plurality of sensors being operatively connected to said pair of sealing mechanisms and said controller, and said plurality of sensors sensing the proper position of said pair of sealing mechanisms relative to an open or non testing position and said closed or testing position and communicate a signal to said controller before applying one of the pressure and the vacuum to said reservoir.

16. The method of testing the recuperator core of claim 15 including said plurality of sensors include a plurality of safety devices operatively attached to said controller.

17. The method of testing the recuperator core of claim 11 wherein said step of displaying said decay rate includes a readout station.

18. The method of testing the recuperator core of claim 17 wherein said readout station being a viewable screen.

19. The method of testing the recuperator core of claim 17 wherein said readout station printing a decay rate on said recuperator core.

20. The method of testing the recuperator core of claim 17 wherein said readout station indicating said decay rate defines as a loss of one of a pressure and vacuum per a unit of time.